



WHY BUILDING CONSTRUCTION?

All firefighters should have a basic knowledge of building construction for a number of reasons. First, knowledge of construction and building components help us to better convey fire protection recommendations to building professionals and tradesmen. Second and most importantly is safety. Understanding the effects of fire impingement upon structural members based on building types helps us to recognize the signs of early collapse as well as determining tactical objectives based upon the type of construction.

Essentially, there are five basic classifications of building construction that are recognized by NFPA 220, *Standard on Types of Building Construction*: Type I Fire Resistive, Type II Non-Combustible, Type III

Limited Combustible or Ordinary Construction, Type IV Heavy Timber, and our most notable, Type V Wood Frame.

Type I: Fire Resistive

In type I construction, the structural elements are non-combustible and are protected. Type I is sub-divided into two or three categories depending upon which model code is quoted. The difference between them is the level of protection for the structural elements. Only non-combustible materials are permitted. Structural steel components are not to be exposed and are usually protected through encasement (concrete, gypsum, sprayed-on coatings). A high-rise building with steel structure encasement in concrete would be an example of type I construction. We as firefighters must not think that fire resistive buildings will resist the effects of fire for an extended period of time; extensive damage can still occur. These buildings can hold high temperatures, especially in newer buildings with large amounts of drywall.

Type II: Non-Combustible

In type II construction, the structural elements are noncombustible or limited combustible. Type II can also be sub-divided into different categories dependant upon the level of protection (in hours) for the structural elements. The buildings are non-combustible, but have little to no fire resistance for the structural elements. A strip mall with block walls, steel bar joist, unprotected steel columns, and a metal deck roof is an example of a type II building. Fire in these buildings can quickly reach in excess of 1000 degrees. When steel reaches its failure temperature (approx. 1100 degrees), collapse can occur. Cooling the overhead of the structure can help to control the fire's effect on roofing; large streams may be a consideration.

Type III: Limited Combustible (Ordinary Construction)

In type III construction, the exterior of the building is non-combustible (masonry, load-bearing), and may be rated depending upon the horizontal distance to exposures. The interior structural elements may be combustible or a combination of combustible/non-combustible elements. Type III can be divided into two sub-divisions: protected and unprotected. Some of these buildings may be found in older established areas of our county such as Silver Spring, Bethesda, or Takoma Park, predating current construction trends (*buildings with masonry veneer over combustible framing are not type III*). Fire in buildings of ordinary construction can typically be contained with an interior/offensive attack because the plaster lath walls will usually contain the fire for a period of time. If fire penetrates the walls, the wood lath will add to the fuel load.

Type IV: Heavy Timber

In type IV, the exterior walls are non-combustible (masonry), and the interior structural elements are unprotected wood of large cross-sectional dimensions. NFPA 220 describes the dimensions of columns being a minimum of 8 inches if supporting a floor load, and joist or beams at a minimum of 6 inches in width and 10 inches in depth. Large diameter wood members inherently possess a quality of fire resistance.

Type V: Wood Frame

In type V construction, the entire structure may be constructed of wood or any other approved material. Brick veneer may be applied, but the structural elements are wood frame. Type V is sub-divided into protected and unprotected, depending upon the protection provided for the various structural elements. We are all familiar with light-weight, wood frame construction and the dangers that they present throughout our county.

The only way to know differences in construction is to go out into our first and second due areas and study the buildings inside and out. As developers break ground on new construction in our area, we must observe the types of building components being used, their fire protection systems (or lack of), and any access issue associated during the construction process.

Only through strong preplanning will you be able to:

KNOW YOUR BUILDINGS!

KEEP IT SAFE!



“DEDICATION TO EDUCATION”

